

ARCHITECTURAL DRAFTING AND DESIGN II

Architectural Drafting and Design II presents a history and survey of architecture and focuses on the creative design of buildings in a studio environment. This course covers problems of site analysis, facilities programming, space planning, conceptual design, proper use of materials, and selection of structure and construction techniques. Students develop presentation drawings, and give oral presentations and critiques. Generation of form and space is addressed through basic architectural theory, related architectural styles, design strategies, and a visual representation of the student's design process. This course will focus on advanced Computer Aided Design (CAD) techniques, including fundamentals of three-dimensional modeling for design. It includes an overview of modeling, graphical manipulation, part structuring, coordinate system, and developing strategies of modeling. Advanced CAD will enable the student to make the transition from 2D drafting to 3D modeling. Various Architectural software packages and applications may be used.

- DOE Code: 5652
- Recommended Grade Level: Grade 12
- Recommended Prerequisites: Architectural Drafting and Design I
- Credits: 2-3 credits per semester, maximum of 6 credits
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- This course is aligned with postsecondary courses for Dual Credit:
 - Ivy Tech
 - DESN 105-Architectural Design I
 - DESN 113-Intermediate CAD
 - Vincennes University
 - ARCH 221- Advanced Architectural Software Applications

Dual Credit

This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content and Multiple Hour Offerings

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in SkillsUSA, the CTSO for this area.

Content Standards

Domain – History of Architectures

Core Standard 1 Students evaluate historical architecture to understand the styles and trends.

Standards

- ADDII-1.1 Identify the distinguishable design characteristics of the significant architectural styles in the history of civilizations
- ADDII-1.2 Integrate history, theory, technology and structures to influence formal and conceptual design manifested in materials, details, language and imagery

Domain – Using the Design Process and Tools in Architectural Planning

Core Standard 2 Students establish design concepts to meet the project requirements.

Standards

- ADDII-2.1 Comprehend and discuss the purpose and need for “facilities programming”
- ADDII-2.2 Conceptualization of sketches and diagrams that demonstrate problem solving of programmatic issues
- ADDII-2.3 Utilize fundamentals of formal conceptual relationships, design methodology, and design process
- ADDII-2.4 Develop basic spatial and compositional ideas introduced through the study of typology, diagrams, and process of conceptualization
- ADDII-2.5 Demonstrate an ability to represent ideas in form and space, as a conceptual and cultural response to program, type, basic building construction, architectural language and design methods
- ADDII-2.6 Apply basic building codes in the context of social, political, civic and environmental responsibilities relative to our society
- ADDII-2.7 Analyze forces and loads on a structure
- ADDII-2.8 Identify line weights and how they relate to specific line types
- ADDII-2.9 Create standard drawings for commercial building structures

Domain – Utilization of CAD Software in Architecture

Core Standard 3 Students utilize advanced commands to develop drawings to meet industry standards.

Standards

- ADDII-3.1 Demonstrate competence in the use of CAD software through assignments
- ADDII-3.2 Modify drawing elements using advanced editing commands
- ADDII-3.3 Accurately complete assignments using advanced CAD commands
- ADDII-3.4 Accurately complete assignments using: xref, design center, advanced plotting techniques, advance dimensioning, viewports, and materials library
- ADDII-3.5 Troubleshoot and problem solve mathematical concepts by utilizing CAD tools

Domain – Solving Advanced Design Challenges in Architectural Drafting

Core Standard 4 Students integrate design concepts to build architectural construction drawings.

Standards

- ADDII-4.1 Manage 3D space
- ADDII-4.2 Create, modify, and use 3D wire frame, surface, and solid models
- ADDII-4.3 Construct a surface or a solid model

- ADDII-4.4 Create production drawings of the 3D models
- ADDII-4.5 Create 2D drawings from 3D Architectural objects
- ADDII-4.6 Design a commercial floor plan
- ADDII-4.7 Create commercial roof plans
- ADDII-4.8 Create floor systems and reflected ceiling plans
- ADDII-4.9 Design commercial elevations
- ADDII-4.10 Draw sections
- ADDII-4.11 Produce production schedules
- ADDII-4.12 Create photo-realistic renderings
- ADDII-4.13 Create construction documents
- ADDII-4.14 Create a final project
- ADDII-4.15 Implement dimensioning in drawings
- ADDII-4.16 Render an object
- ADDII-4.17 Introduce lighting to a scene
- ADDII-4.18 Attaching materials from the materials library to objects

Domain – Careers in Architectural Drafting

Core Standard 5 Students evaluate and explore architectural careers and opportunities.

Standards

- ADDII-5.1 Compare architectural drafting careers
- ADDII-5.2 Investigate architectural drafting opportunities offered by a technical school or college
- ADDII-5.3 Determine architectural drafting occupation wages/salaries
- ADDII-5.4 Explore architectural drafting job outlook information
- ADDII-5.5 Participates job shadowing of an architectural job
- ADDII-5.6 Research international architectural drafting opportunities

Process Standards

Common Core Literacy Standards for Technical Subjects

Reading Standards for Literacy in Technical Subjects 11-12

The standards below begin at grade 11 and define what students should understand and be able to do by the end of grade 12. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations – the former providing broad standards, the latter providing additional specificity.

Key Ideas and Details

- 11-12.RT.1 Cite specific textual evidence to support analysis of technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- 11-12.RT.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- 11-12.RT.3 Follow precisely a complex multistep procedure when performing technical tasks;

analyze the specific results based on explanations in the text.

Craft and Structure

- 11-12.RT.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific context relevant to *grades 11-12 texts and topics*.
- 11-12.RT.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
- 11-12.RT.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

Integration of Knowledge and Idea

- 11-12.RT.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- 11-12.RT.8 Evaluate the hypotheses, data, analysis, and conclusions in a technical subject, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- 11-12.RT.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Range of Reading and Level of Text Complexity

- 11-12.RT.10 By the end of grade 12, read and comprehend technical texts in the grades 11-CCR text complexity band independently and proficiently.

Writing Standards for Literacy in Technical Subjects 11-12

The standards below begin at grade 11 and define what students should understand and be able to do by the end of grade 12. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations – the former providing broad standards, the latter providing additional specificity.

Text Types and Purposes

- 11-12.WT.1 Write arguments focused on *discipline-specific content*.
- 11-12.WT.2 Write informative/explanatory texts, including technical processes.
- 11-12.WT.3 Students will not write narratives in technical subjects. *Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In technical, students must be able to write precise enough descriptions of the step-by-step procedures they use in their technical work that others can replicate them and (possibly) reach the same results.*

Production and Distribution of Writing

- 11-12.WT.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- 11-12.WT.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

- 11-12.WT.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Research to Build and Present Knowledge

- 11-12.WT.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- 11-12.WT.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation
- 11-12.WT.9 Draw evidence from informational texts to support analysis, reflection, and research.

Range of Writing

- 11-12.WT.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.